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ABSTRACT

Presented at the 1980 meeting of the National Science Teachers Association, the paper discusses some psychoeducational considerations for planning science instruction for the physically disabled. It is suggested that science teachers and educators must come to understand adjustment to disability, both through the eyes of the handicapped student as well as through their own eyes. The teachers' involvement in the individualized education program (IEP) planning and preparation process is examined, and the G-SOME teacher decision making model is described as a possible approach for use by science teachers in IEP writing. (DLS)

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PSYCHO-EDUCATIONAL CONSIDERATIONS WHEN PLANNING SCIENCE INSTRUCTION FOR THE PHYSICALLY DISABLED

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SESSION TITLE: Solving Science Teaching Problems of Students with Orthopedic and other Handicaps

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INTRODUCTION

Physical disabilities have personal, social, and educational implications that are vital in planning and developing of an effective educational program by science educators for the handicapped. If science education is going to be meaningful and useful to the handicapped youngster it must take into serious consideration some psycho-educational factors that will be discussed as the central focus of this paper. In some academic areas, these considerations might be more unique than in others, such as science versus literature, or within science, such as physics versus chemistry. A brief case in point would be the need for access to laboratory experiences and the use of special chemicals and equipment, versus a book or straight lecture approach alone. In addition to access per se, factors of safety, and the instructors stereoptyes of expectancies will all interact to influence the roles of both teacher, peers, and the physically disabled individual.

NEED TO UNDERSTAND ADJUSTMENT TO DISABILITY

The first, and foremost need of the science teacher is to develop a functional theory toward understanding the adjustment to having a disability. This implies a self-examination by the science teacher, and a concurrent external view towards the diversity of physical disabilities that might appear in his or her classroom situation. The following questions might assist in the understanding of this assumption.

1. What personal implications are there that effects that unique disability which are immediate consequences upon sensory, motor, or cognitive functioning ?

   a. i.e. effects of arthritis are limitations of movement in the joints,

   b. i.e. is the blindness or deafness total or partial, and at what age of onset ?,

c. i.e. allergies to chemical and/or biological substances,

d. i.e. manifestations due to specific learning disabilities involving the central nervous system, such as poor eye-hand coordination, reversals in writing and reading, etc.,

2. What reactions does the student, teacher, and peers have toward the unique disability ?

a. i.e. thoughts and actions employed to manage the problem in living and adjustment to the school environment that the disability precipates,

b. i.e. attitudes of acceptance or fear by all parties concerned.

3. How will the teacher and disabled student interact with each other in the adjustment effort ?

4. What experiences have the peers and teacher had with mainstreaming efforts in the past, if any, because these will prove to be motivating.

Thus, the knowledge and understanding of some of these psycho-educational relationships and the differences between effects and reactions may well determine the desire of a handicapped student to take a course in science, and maybe even a career in the scientific field.

Hellen Keller is a classical case of a brillant mind that was assisted in surmounting tremendous handicaps handicaps and physical disabilities. Yes, we see many individuals with physical disabilities in science today, but what we do not know is how many other creative and bright individuals have been excluded because of inadequate science instruction. It is to this latter point that special educators and science educators must focus their mutual support. It is this loss of an uncertain sum of talent that must challenge science educators today.

Is there a difference between disability and handicaps ? Yes, there is a difference between physical limitations and related psychological stress and problems. It is beyond the purpose of this paper to go into a detailed discussion of this point. So, to help the instructor of science who might be interested, the following readings are suggested. Lee Meyerson's classical chapter, "Somatopsychology of Physical Disability" in the third edition of Psychology of Exceptional Children and Youth *edited by William M. Cruickshank is a must. In addition, two more chapters in the recent fourth edition of the same title by Cruickshank would prove most helpful, Franklin C. Shontz's "Theories About Ajustment to Having a Disability" and "A Handicap as a Social Phenomena" by Nettie Bartel and Samuel L. Guskin. This initial reading will help the science educator cultivate a social science perspective towards disability and handicaps.*

SOME PSYCHO-EDUCATIONAL IMPLICATIONS

In the fields of special education and rehabilitation it is generally assumed that one is dealing with disabled or handicapped individuals; that is, persons who have certain intrinsically unhealthy or undesirable characteristics which have been or may be diagnosed by a psychologist or physician which require a distinct treatment procedure. Regarding such view, Bartel and Guskin (1980) advise that the position is distinctive about and common to all handicapped individuals is not so much their own characteristics as it is the characteristic response of others to them.

What is a social definition of handicap that science educators might want to consider ? This writer would like to suggest the definition offered by Freidson (1965):

> *"What is a handicap in social terms ? It is an imputation of difference from others; more particularly, imputation of an undesirable difference. By definition, then, a person said to be handicapped is so defined because he deviates from what he himself or others believe to be normal or appropriate." p. 72*

Thus, it becomes evident that our society and social system to a great extent will tend to define disability and handicaps which we all must examine with a critical view. By the very nature of the scientific method used by science educators, a critical examination of such definitions might be easier. In addition, because many scientist appreciate the law of serendipity and accept it, they just might have a greater understanding and tolerance for individual differences or deviations.

Science educators will need to learn to cope with labeling, defining, and recognizing handicaps as part of the mainstreaming philosophy and practice that is sweeping American education today in the public schools ranging from preschool to post graduate work. P.L. 94-142 was enacted by Congress in November 1975. The cornerstone of P.L. 94-142 is the provision of a free <u>appropriate</u> public education to handicapped students. It is the responsibility of the science educator to see that the handicapped get an <u>appropriate science</u> instructional program. One valuable way that the science educator can have a voice is in helping prepare the goals and objectives for science subjects in the IEP (Individual Education Program). This involvement by the science educator should help provide more viable instruction. Too often science instruction for many handicap children has been shoddy to fractionated, especially in the elementary years or in a special class setting. This was not intentional, but rather based upon the limited and or particular knowledge the teachers had

about science subject matter. With the impact of P.L. 94-142 and the preparation of IEP's involving science educators, this inappropriate behavior of the past can now be corrected. The focus and thrust for for this change must be the challenge of the science educator. Thus, it becomes imperative for science educators to become familarized with and involved in the IEP preparation process. The nature and merit of an IEP can and will have a serious impact on future science instruction for the physically handicapped, and their social, educational, and personal expectations.

SCIENCE EDUCATORS AND IEP'S

Science educators should be aware of the contents of the IEP which include the following:

1. A documentation of the handicapped student's current level of educational performance.
2. Annual goals or the attainments expected by the end of the school year.
3. Short-term objectives, stated in instructional terms, which are the intermediate steps leading to the mastery of annual goals.
4. Documentation of the particular special education and related services which will be provided to the child.
5. An indication of the extent of time a child will participate in the regular education program.
6. Projected dates for initiating services and the anticipated duration of services.
7. Evaluation procedures and schedules for determining mastery of short-term objectives at least on an annual basis.

Each of these seven factors have implications for science education. They can serve as the basis for an effective scope and sequence for a viable instructional program in science. Since the parents and student are also involved in the IEP preparation, they can now be made aware of what is an effective science instructional program. This is one critical way in

correcting past abuses. Furthermore, the science instructor can now insist upon the necessary equipment and materials to get the job done properly in meeting the science education needs of the handicapped. It is the responsibility of the science educator to state and explain what is an appropriate science education when working with special educators and other professionals, as well as the parent and child, as might be appropriate.

DECISION MAKING PROCESS

Science educators will need a planning and decision making process if they are going to play an effective and decisive role in IEP writing. They will need a systematic decision model to guide and assist them. One such model would be through the use of the G-SOME decision model for teachers as advocated by Lazar (1971, 1972). A brief outline is provided below, and the interested science educator is directed to the references cited at the conclusion of the paper.

G-SOME Model for Teachers

1. G - This is the general factor or component. This includes general information about human development, learning, human exceptionality, curriculum theory and making, and knowledge to be an effective instructor. This would apply to all educators, including science educators and teachers.
2. S - Here the teacher makes a survey as to the needs, strengths, and weaknesses of the disabled student. In terms of the IEP, a documentation is made of the handicapped student's current level of education performance.

3. O - In this component, a task analysis of educational goals and objectives are completed, considering the unique learning characteristics of the handicapped student such as rate of learning, mode of learning, learning styles, and modality preference. For the science educator this would also involve the planning and development of proposed IEP goals and objectives, both long range and intermediate. Implementation plans would also be suggested. Data in this section, when combined with the S component would provide us with a learning profile as the the science needs of the youngster.

4. M - Methods of instruction comprise this component. Included would be special equipment, materials, and personnel that are needed to achieve an appropriate education in science. Motivation and reinforcement schedules for learning would also be identified for possible use. Documentation of the particular services would be made here along with the decision about the least restricive environment for the delivery of the science education.

5. E - Evaluation procedures and schedules would be identified and planned. Use of feedback loops would also be considered and utilized. Rewriting of goals and objectives in the IEP requirement would be considered as needed. Various forms of instructional and learner evaluation would be invloved: teacher self-evaluation, learner self-evaluation, joint teacher-learner evaluation, and evaluation by significant others related to the IEP and school situation, including parents.

SUMMARY

In this presentation, it has been suggested that the science teacher or educator must develop a need to understand adjustment to disability, both through the eyes of the handicapped as well as the teacher/educator per se. Some select psycho-educational considerations were discussed, including involvement in the IEP planning and preparation process by the science teacher. Finally, the G-SOME teacher decision making model was mentioned as a possible approach for use by science teachers.

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